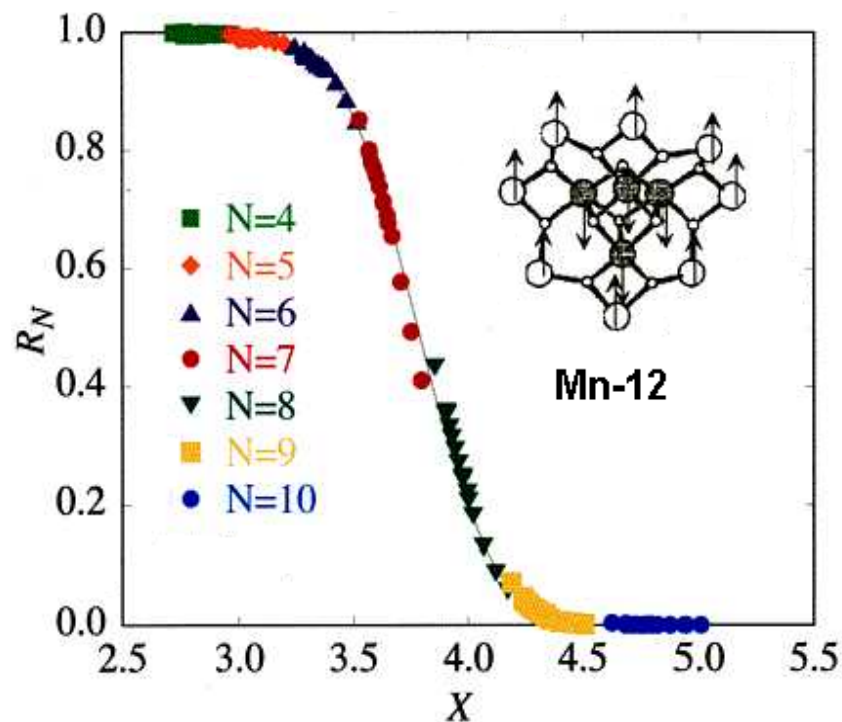


Quantum Micromagnetism

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- Crystals of molecular nanomagnets are new materials that emerged in 1990s. They exhibit spectacular magnetic properties which are explained by quantum physics.
- The most famous material of that group is Mn-12 acetate. It consists of tiny nanometer-scale magnets whose magnetic poles constantly interchange due to the effect of quantum tunneling.
- The mechanism of this effect has been recently explained by Chudnovsky and Garanin (Physical Review Letters - 2001) who suggested that crystal defects were responsible for tunneling. This suggestion has been confirmed by several experimental groups working in the US and Europe.
- Potential applications of molecular nanomagnets include high-density data storage, quantum computing, and generation of microwave radiation.



Magnetic relaxation in Mn-12 acetate. Color points are experimental data taken in the laboratory of M. Sarachik of CCNY (PRL 87, 227205 (2001)), which represent seven different curves scaled onto one master curve predicted by Chudnovsky and Garanin (PRL 87, 187203 (2001)).